FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES	**215239US2PCT**
DESIGNATED/ELECTED OFFICE (DO/EO/US)	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR
CONCERNING A FILING UNDER 35 U.S.C. 371	**09/926451**

INTERNATIONAL APPLICATION NO. **PCT/SE00/00881**	INTERNATIONAL FILING DATE **3 May 2000**	PRIORITY DATE CLAIMED **6 May 1999**

TITLE OF INVENTION

PROCEDURE AND DEVICE FOR CONTROL OF DATA FILE TRANSMISSION

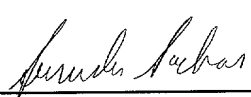APPLICANT(S) FOR DO/EO/US

JOHANSSON Joachim et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.

4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).

5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))

     a. ☐ is attached hereto (required only if not communicated by the International Bureau).

     b. ☒ has been communicated by the International Bureau.

     c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).

     a. ☐ is attached hereto.

     b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))

     a. ☐ are attached hereto (required only if not communicated by the International Bureau).

     b. ☐ have been communicated by the International Bureau.

     c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.

     d. ☒ have not been made and will not be made.

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).

10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).

12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

15. ☒ A **FIRST** preliminary amendment.

16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.

17. ☐ A substitute specification.

18. ☐ A change of power of attorney and/or address letter.

19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.

20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).

21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

22. ☐ Certificate of Mailing by Express Mail

23. ☒ Other items or information:

     Request for Consideration of Documents Cited in International Search Report/Request for Priority PCT/IB/308

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/926451	PCT/SE00/00881	215239US2PCT

24.   The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	$1040.00	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$890.00	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	$740.00	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	$710.00	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	$100.00	

ENTER APPROPRIATE BASIC FEE AMOUNT =	**$1,040.00**	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$130.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	14 - 20 =	0	x $18.00	$0.00	
Independent claims	2 - 3 =	0	x $84.00	$0.00	
Multiple Dependent Claims (**check if applicable**).			☐	$0.00	

TOTAL OF ABOVE CALCULATIONS =	**$1,170.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.	**$0.00**	
SUBTOTAL =	**$1,170.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +	**$0.00**	
TOTAL NATIONAL FEE =	**$1,170.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (**check if applicable**). ☐	**$0.00**	
TOTAL FEES ENCLOSED =	**$1,170.00**	

Amount to be: refunded	$
charged	$

a. ☒   A check in the amount of   **$1,170.00**   to cover the above fees is enclosed.

b. ☐   Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒   The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No.   **15-0030**   A duplicate copy of this sheet is enclosed.

d. ☐   Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Surinder Sachar
Registration No. 34,423

22850

signature

SIGNATURE

Marvin J. Spivak

NAME

24,913

REGISTRATION NUMBER

Nov. 6 2001

DATE

215239US

<u>IN THE UNITED STATES PATENT & TRADEMARK OFFICE</u>

IN RE APPLICATION OF   :

JOACHIM JOHANSSON ET AL   : ATTN: APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLICATION
                                                       :
 (Based on PCT/SE00/00881)

FILED: HEREWITH   :

FOR: PROCEDURE AND DEVICE   :
          FOR CONTROL OF DATA FILE
          TRANSMISSION

<u>PRELIMINARY AMENDMENT</u>

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified

application as follows.

<u>IN THE CLAIMS</u>

Please cancel Claims 1-18 without prejudice.

Please add new Claims 19-32 as follows:

19. (New) Procedure for control of data file transmission between transmitting units

and receiving units, at which examples of a data file to be transmitted/transferred are stored

at the transmitting units, comprising the steps:

to request transmission of segments of the data file from the transmitting units, and

to receive said segments from the transmitting units, when the transmission of one of said segments from one of the transmitting units is completed, to request transmission of one more segment of the data file from another transmitting unit of said transmitting units, at which the transmission of this one more segment from the another transmitting unit has started, at which the step to request transmission of one more segment includes the step

to request transmission of only a portion of said one more segment, at which the portion is included in the portion of the segment that as not yet been transferred.

20. (New) Procedure as claimed in patent Claim 19, wherein each segment is transmitted from only one transmitting unit.

21. (New) Procedure as claimed in patent Claim 19, wherein each transmitting unit transmits only one segment of the file.

22. (New) Procedure as claimed in patent Claim 19, wherein the step to request transmission of one more segment includes the steps

to determine for which segment a largest portion of the segment remains to be transmitted, and

to request transmission of this determined segment.

23. (New) Procedure as claimed in patent Claim 19, wherein the step to request transmission of a portion of said segment includes the steps

to determine how large a portion of the segment that remains to be transferred,

to estimate a transmission speed for the transmitting unit that is busy transmitting said segment and for the transmitting unit from which transmission of said portion is to be requested,

to determine, depending on the estimate transmission speeds, how large said portion shall be, and

to request transmission of said portion.

24. (New) Procedure as claimed in patent Claim 19, further comprising the steps

to estimate transmission speeds from respective transmitting units, and

to request transmission of segments of different sizes, at which a size of respective

segments is determined based on the estimated transmission speeds.

25. (New) Procedure as claimed in patent Claim 19, further comprising the steps

to estimate transmission speeds from respective transmitting units, and

to select transmitting units for the transmission with regard to the estimated

transmission speed from the respective transmitting units.

26. (New) Device for control of data file transmission between transmitting units

and receiving units, at which examples of a data file to be transferred is stored at a plurality

of transmitting units, comprising:

a device to request transmission of segments of the data file from the transmitting

units, and

a device to receive said segments from the transmitting units, when the transmission

of one of said segments from one of the transmitting units is completed, to request

transmission of one more segment of the data file from another transmitting unit of said

transmission units, at which the transmission of the one more segment from the another

transmitting unit has started, at which the device to request transmission of one more

segment includes

a device to request transmission of only a portion of said segment, at which the

portion is included in that portion of the segment that has not yet been transferred.

27. (New) Device as claimed in patent Clam 26, wherein each segment is

transmitted from only one transmitting unit.

28. (New) Device as claimed in patent Claim 26, wherein each transmitting unit transmits only one segment of the file.

29. (New) Device as claimed in patent Claim 26, wherein the device to request transmission of one more segment includes

a device to determine for which segment a largest portion of the segment remains to be transmitted, and

a device to request transmission of this determined segment.

30. (New) Device as claimed in patent Claim 29, wherein the device to request transmission of a portion of said segment, includes

a device to determine how large a portion of the segment that remains to be transferred,

a device to estimate a transmission speed for the transmitting unit which is busy transmitting said segment and for the transmitting unit from which transmission of said portion is to be requested,

a device to determine, depending on the estimated transmission speeds, a size of said portion, and

a device to request transmission of said portion.

31. (New) Device as claimed in patent Claim 26, further comprising

a device to estimate transmission speeds from respective transmitting units, and

a device to request transmission of segments of different sizes, at which said device is arranged to determine the size of respective segment based on the estimated transmission speeds.

32. (New) Device as claimed in patent Claim 26, further comprising

a device to estimate transmission speeds from respective transmitting units, and

a device to select transmitting units for the transmission with regard to the estimated transmission speed from the respective transmitting units.

IN THE ABSTRACT OF THE DISCLOSURE

Please amend the abstract on page 16 as follows:

ABSTRACT

A procedure for control of data file transmission between transmitting and receiving units, at which examples of the data file to be transmitted/transferred are stored at a plurality of the transmitting units, and a device to effect this procedure. The control of the data file transmission is performed according to the following procedure. Transmission of segments of the wanted data file from a plurality of transmitting units is requested, and these segments are received from the transmitting units. When the transmission of a segment of the data file from a first server is finished, transmission of one more segment of the data file is requested, for which transmission from another server has started but not been finished, from the first server. This is after that repeated until all segments have been transmitted, at which transmissions in progress are stopped and the segments are put together to the wanted file.

REMARKS

Favorable consideration of this application, in view of the following comments and as presently amended, is respectfully requested.
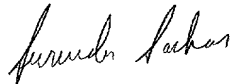
The present preliminary amendment is submitted to place the above-identified application in more proper format under United States practice. By the present preliminary amendment original Claims 1-18 are cancelled and new Claims 19-32 are presented for

examination. New Claims 19-32 are deemed to be self-evident from the original disclosure, including the original claims, and thus are not deemed to raise any issues of new matter.

The Abstract has also been amended by the present response to be in more proper format under United States practice.

Respectfully submitted,

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MAIER & NEUSTADT, P.C.

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IN THE CLAIMS

Please cancel Claims 1-18 without prejudice.

Please add new Claims 19-32.

IN THE ABSTRACT

--A procedure for control of data file transmission between transmitting [(30-33)] and receiving units [(20)], at which examples of the data file [(F) that shall] to be transmitted/transferred are stored at a plurality of the transmitting units [(30-33)], and a device to effect this procedure. The control of the data file transmission is performed according to the following[:] procedure. Transmission of segments [(S1-S4)] of the wanted data file [(F)] from a plurality of transmitting units [(30-33)] is requested, and these segments are received from [these] the transmitting units [(30-33)]. When the transmission of a segment [(S1-S4)] of the data file [(F)] from a first server [(31)] is finished, transmission of one more segment [(S1)] of the data file [(F)] is requested, for which transmission from another server [(30)] has started but not been finished, from the first server [(3.1)]. This is after that repeated until all segments [(S1-S4)] have been transmitted, at which transmissions [is] in progress are stopped and the segments [(S1-S4)] are put together to the wanted file [(F)].--

PROCEDURE AND DEVICE FOR
CONTROL OF DATA FILE TRANSMISSION

Field of the invention

The invention relates to transmission of data files.
More specifically the invention relates to a procedure for
control of data file transmission between transmitting and
receiving units, at which examples of the data file that
shall be transmitted are stored at a plurality of units.
The invention also relates to a device to perform this
procedure.

Technical background

At transmission of data files from a transmitting
unit, or a server, to a receiving unit, for instance over
Internet, it frequently occurs that the transmitting unit,
or the network that is utilized for the transmission, is
overloaded. This may result in that the transmission speed
from a server to the receiving unit will be very low, which
in its turn results in very long transfer times and also
can result in that the transmission will be unsuccessful.

However, it is usual, i.a. on the Internet, that files
are copied and distributed to a plurality of servers in
order to share the load on these servers that files that
are frequently requested to be transmitted can result in.
This will reduce the risk of overloading and, of course,
also opens for the possibility to break off a too slow
transmission of a file, and request a transmission of the
file from another server.

A problem in the situation is that the user or
the receiving unit does not know which server, or which
part of the network, that for the time being has a low
load. By that there also will be the risk that also this
server is, or will be, overloaded and that the transmission

is slowed down or has to be broken. There also is a risk of imbalance of networks and servers.

Summary of the invention

Consequently one aim of the invention is to create a procedure, and a corresponding device, for control of data file transmission that reduces the risk of overload of transmitting units and transmission networks.

It is also an aim of the present invention to create a procedure, and a corresponding device, that makes a more efficient control of data file transmission between transmitting and receiving units.

Above said and other aims are effected, according to the present invention, by a procedure and a device with the characteristics that are defined in the independent patent claims. Preferred embodiments are defined by the dependent patent claims.

According to a first aspect of the invention, this is expressed in a procedure of, by way of introduction, mentioned kind, including the steps to request transmission of segments of the data file from a plurality of transmitting units, and to receive segments from a plurality of transmitting units.

According to a second aspect of the present invention, a device is made, comprising device to request transmission of segments of the data file from a plurality of transmitting units, and device to receive said segments from a plurality of transmitting units.

The invention consequently is based on the understanding of the advantage of the transmission of the wanted data file being made from a plurality of transmitting units by different segments of the data file being transmitted from the different transmitting units. This results in the advantage that if a transmitting unit is overloaded, and the transmission speed from this unit is greatly reduced, only one segment of the file is

influenced. By that, the total transfer time of the file
can be considerably reduced compared with if the whole file
should be transmitted from a unit with low transmission
speed. This solution requires that at least one example of
the data file that shall be transmitted exists at, at
least, two transmitting units.

After finished transmission of the segments, the
transferred segments are put together to a complete data
file. This is preferably made in the receiving unit.

By segment is related to a certain amount of
information of a data file. According to the invention, the
data file that shall be transmitted consists of at least
two segments of the same size, or of varying sizes. The
size and number of the segments, and which part of the file
the segment constitutes, is determined by the unit that
requests the transmission.

Examples of the data file existing at different
transmitting units need not necessarily be identical copies
of the data file. At transmission of most file types,
however, the transmission and the subsequent putting
together of the segments are facilitated if the examples
are essentially similar both regarding size and content.

A request for transmission of a segment of a data file
is preferably transmitted to a plurality of transmitting
units in such a way that only one request for transmission
is initially transmitted for respective segment, and that
the segments together constitute the entire file.
Initially, preferably only one request for transmission of
a segment of the data file is transmitted to respective
transmitting unit.

According to a preferred embodiment of the invention,
the transmission capacity of the transmitting units that
first finish the requested transmission of a segment to the
receiving unit, is also utilized for transmission of the
segments for which the transmission has started but not
been finished. This is preferably done by, when the

transmission of a segment has been finished, a request for a transmission of a segment that has not been completely transferred, i.e. where the transmission is still in progress, being transmitted to the transmitting unit that has finished its transmission. The advantage achieved by this embodiment of the invention is that a plurality of segments can be transmitted from the transmitting units with highest capacity without any check or estimation of the transmission speeds being needed before transmission of the data file is requested. This step is repeated until all segments of the data file have been transferred. Preferably, but not necessarily, all transmissions of segments of the data file in question that have not been finished, are broken.

To achieve as high a total transmission speed as possible, a check is first made, according to an embodiment of the invention, for which segment, or from which transmitting unit, the transmission speed has been lowest, i.e. where the largest portion of the segment still remains to be transferred. After that, transmission of just this segment of the data file is requested. The advantage of this is that the risk of a blocking caused by the transmission from a transmitting unit being stopped, or being performed very slowly, for instance due to overload of network or server, is eliminated.

According to yet another embodiment of the invention, transmission of only a portion of a segment is requested from the unit that has completed transmission of a segment. This portion constitutes the portion, or part of the portion, of the segment, where transmission has not yet been completed. By that, no request for transmission of any portion of the data file that has already been transferred to the receiving unit is made, which results in the advantage that the total transmission speed can be further improved.

The portion of the segment for which transmission is
requested can constitute the whole portion of the segment
that remains to be transmitted, or, according to a
preferred embodiment, a portion that constitutes a part of
the remaining portion. How large part of the portion that
shall be transferred is determined in relation to the
transmission speeds for the transmitting unit that is busy
transmitting the segment in question, and for the
transmitting unit from which transmission of the part of
the portion shall be requested. The size of said part of
the portion is selected in such a way that the transmission
of this part and the transmission of the remaining part of
the portion, from the transmitting unit that has originally
started the transmission of the segment, essentially takes
the same time, which results in the advantage that the
transfer time of this segment will be further shortened.
The estimation of the transfer times is based on so far
transmitted amount of the data file in question.

According to an alternative embodiment of the
invention, the transmission speeds of the transmitting
units that can be of current interest for the transmission
of a data file, i.e., which have examples of the file in
question, are estimated before transmission is requested.
These estimated transmission speeds can with advantage be
utilized to disregard the transmitting units with lowest
transmission speeds. They also can be utilized to request
transmission of segments of different sizes, where the size
of respective segment is selected proportionally to
respective transmission speed.

The present invention consequently results in the
overall advantage that a sharing of the load that is caused
by file transmission is effected in such a way that the
route that on each occasion is least loaded will be most
utilized for the transmission of the file in question. By
that, the situation is also improved for the users who do

not make use of the procedure or the device according to
the present invention.

It should be realized that the above discussed
embodiments and characteristics can be combined in
advantageous ways, depending on present application.

Further characteristics of the invention will be
obvious by the following description of exemplifying
embodiments of these and by the enclosed patent claims.

Brief description of the drawings

The invention now will be described by means of
exemplified embodiments with reference to the enclosed
figures, in which:

Figure 1 diagrammatically shows a system to effect a
procedure according to the present invention.

Figure 2a-2d diagrammatically shows a course of events
according to a preferred embodiment of the present
invention,

Figure 3a-3d diagrammatically shows a course of events
according to a preferred embodiment of the present
invention, and

Figure 4a diagrammatically shows a step corresponding
to the step that is shown in Figure 2a, respective 3a, of a
course of events of an alternative embodiment of the
present invention.

Detailed description of preferred embodiments

Figure 1 shows diagrammatically a system to effect the
procedure according to embodiments of the invention. The
system includes a receiving unit or computer 20 and a
number of transmitting units or servers 30, 31, 32, 33,
which all are interconnected by connection to a network 10,
which in preferred embodiments is constituted by Internet.
With respective server 30, 31, 32, 33 is stored at least
one example of a data file that one wants to have

transmitted to the computer 20. In order to facilitate the
description, the number of illustrated servers has been
limited to four, which should not be regarded as a
limitation of, or recommendation for, suitable number of
5   servers.

Communication between computer and server is best
performed according to standardized and well-known IP-
protocols.

With reference to the Figures 2a-2b is
10 diagrammatically shown an example of a course of events
according to a preferred embodiment of a procedure
according to the present invention. According to this
example is supposed that the file one wants to have
transferred can be loaded home from four different servers.
15 The reference indication 40 refers to a schematically
illustrated data file, which one wants to have transferred
to the computer 20, and the reference indications S1-S4
indicate segments of the file F. According to this example,
home-loading of the file F is requested from the servers
20 30-31. More specific, home-loading is requested of a first
segment S1 of the file F from a first server 30, of a
second segment S2 from a second server 31, of a third
segment S3 from a third server 32, and of a fourth segment
S4 from a fourth server 33. This is illustrated in Figure
25 2a, where the figure under respective segment refers to the
server 30-33 from which a transmission of respective
segments S1-S4 has been requested, and where the arrow
under respective segment illustrates how large part of the
segment that has been transferred. As can be realized by
30 the short arrows in Figure 2a, this figure illustrates that
the home-loading of the segments S1-S4 from the different
servers 30-33 just has started.

Figure 2b illustrates the transmission of the segments
S1-S4 when the transmission has been going on for a certain
35 period of time. As can be seen in the Figure, the
transmission of segment S1 from the server 30 is slow; the

transmission of segment S2 from server 31 has been very
fast and is already completed, whereas the transmission of
the segments S3 and S4 from server 32 respective 33 is
comparatively fast. When the home-loading of the segment S2
5   from server 31 is completed, the transmission is finished
and transmission of one more segment of the data file F
from server 31 is requested. Because segment S1 is the
segment where the largest portion of the segment remains to
be loaded home, transmission of just this segment is
10   requested, which is illustrated in Figure 2c, just after
that transmission of segment S1 from server 31 has been
requested. As can be seen in Figure 2c the segment S1 is
loaded home parallelly from both server 30 and 31 and the
whole segment S1 is requested to be transferred from server
15   31.

The transmission/transfer of the data file is
completed when the transfer of all segments S1-S4 of the
data file is completed. As can be seen in Figure 2d, the
server 31 has completed the transmission of segment S1, and
20   the servers 32 and 33 have completed the transmission of
segment S3 respective S4. Since the transmission of the
segment S2 has previously been completed, all segments S1-
S4 of the data file F have been transferred, and the
transmission procedure can be stopped, i.e. the
25   transmission in progress of segment S1 from server 30 is
stopped. After that, the transmitted segments S1-S4 are put
together, by the receiving computer, to the wanted file. In
the described course of events, the transmission from the
servers 31, 32 and 33 are completed essentially at the same
30   point of time, which is not necessarily the case. If the
transmission of any segment has been completed while the
transmission of any other segment has not been completed,
this segment is requested to be transferred from the server
that has just completed its transmission. This is after
35   that repeated until all segments are completely
transferred.

With reference to the Figures 3a-3d is shown diagrammatically a preferred embodiment of the invention. The Figures 3a and 3b show the course of events that was described above with reference to the Figures 2a and 2b, which, for that reason, will not be described in detail. In the same way as in the above described example, server 31 has completed the transmission of segment S2 and a transmission of segment S1, for which largest portion of the segment remains to be transmitted, is requested. At this request is taken into consideration how large part of the segment S1 that has already been transferred, i.e. it is only for that portion of the segment S1 that remains to be transmitted that transmission is requested. The transmission of the remaining portion of the segment S1 is then made parallelly, or, as is shown in Figure 3c, the transmission of the remaining portion of the segment S1 is shared between the server 30 and server 31.

At this sharing the transmission speeds for server 30 and 31 are taken into consideration, and the remaining portion of the segment S1 is shared proportionally to these transmission speeds. The current transmission speeds are based on the portion of the segments that have already been transmitted from respective server. This means that, if server 31 relieves server 30 of the remaining portion, which is illustrated by the reference indication S11 in Figure 3c, of the segment S1, and if the transmission from respective server is performed with the same speed as so far, the transmission of respective portion from the two servers 30, 31 will take essentially the same time.

Before transmission of the file is requested, the receiving computer 20 preferably first makes an estimation of the expected transmission speed from respective server, where examples of the wanted file are. This estimation is then used to select from which servers, which need not be all servers where examples of the files are, transmission of the file, or segment of the file, shall be requested.

According to an alternative embodiment, this estimation is also used, as is shown as an example in Figure 4a, to request transmission of segments S5-S8 of different sizes from the servers in question. According to

5 this example, the transmission speed for server 30 has been estimated to be very high, so transmission of a larger segment S5 of the data file is requested from this server 31. The size of respective segment S5-S8 is determined preferably proportionally to the transmission speed for

10 respective server 30-31. This means that the transmission from respective server 30-33 should take essentially the same time. If that is not the case, transmission of not completely transmitted segments is requested in the same way as has been described above.

15 Shown embodiments of the present invention can preferably be realized by implementation that utilizes File Transfer Protocol (FTP), which is a part of the IP-standard.

PATENT CLAIMS

1.   Procedure, for control of data file transmission
between transmitting (30-33) and receiving units (20), at
which examples of the data file (F) that shall be
transmitted/transferred are stored at a plurality of
transmitting units (30-33), including the steps
     to request transmission of segments (S1-S4) of the
data file (F) from a plurality of transmitting units (30-
33), and
     to receive said segments (S1-S4) from a plurality of
transmitting units (30-33).

2.   Procedure, as claimed in patent claim 1, at which
each separate segment (S1-S4) is transmitted from only one
transmitting unit.

3.   Procedure, as claimed in patent claim 1 or 2, at
which each separate transmitting unit transmits only one
segment (S1-S4) of the file.

4.   Procedure, as claimed in patent claim 1,
including the step
     to, when the transmission of a segment (S1-S4) from a
transmitting unit is completed, request transmission of one
more segment (S1) of the data file (F) from said
transmitting unit, at which the transmission of this one
more segment (S1) from another transmitting unit has
started.

5.   Procedure, as claimed in patent claim 4, at which
the step to request transmission of one more segment (S1-
S4) includes the steps
     to determine for which segment (S1-S4) that largest
portion of the segment (S1-S4) remains to be transmitted,
and

to request transmission of this segment (S1).

6. Procedure, as claimed in patent claim 4 or 5, at which the step to request transmission of one more segment (S1) includes the step

to request transmission of only a portion (S11) of said more segment (S1), at which this portion (S11) is included in the portion of the segment (S1) that has not yet been transferred.

7. Procedure, as claimed in patent claim 6, at which the step to request transmission of a portion (S11) of said segment (S1) includes the step

to determine how large portion of the segment (S1) that remains to be transferred,

to estimate the transmission speed for the transmitting unit (30) that is busy transmitting said segment (S1) and for the transmitting unit (31) from which transmission of said portion (S11) shall be requested,

to determine, depending on the estimated transmission speeds, how large said portion (S11) shall be, and

to request transmission of said portion (S11).

8. Procedure, as claimed in any of the previous patent claims, including the steps

to estimate the transmission speeds from respective transmitting unit (30-33), and

to request transmission of segments (S5-S8) of different sizes, at which the size of respective segment is determined on basis of the estimated transmission speeds.

9. Procedure, as claimed in any of the previous patent claims, including the step

to estimate the transmission speeds from respective transmitting unit, and

to select transmitting units (30-33) for the
transmission with regard to the estimated transmission
speed from respective transmitting unit.

5   10.   Device for control of data file transmission
between transmitting (30-33) and receiving units (20), at
which examples of the data file (F) that shall be
transferred is stored at a plurality of transmitting units
(30-33), including
10   device to request transmission of segments (S1-S4) of
the data file (F) from a plurality of transmitting units
(30-33), and
         device to receive said segments (S1-S4) from a
plurality of transmitting units (30-33).
15

         11.   Device, as claimed in patent claim 10, at which
each separate segment (S1-S4) is transmitted from only one
transmitting unit.

20   12.   Device, as claimed in patent claim 10 or 11, at
which each separate transmitting unit transmits only one
segment (S1-S4) of the file.

         13.   Device, as claimed in patent claim 10, including
25 device to, when the transmission of a segments (S1-S4) from
a transmitting unit is completed, request transmission of
one more segment (S1) of the data file (F) from said
transmitting unit, at which the transmission of this one
more segment (S1) from another transmitting unit has
30 started.

         14.   Device, as claimed in patent claim 13, at which
the device to request transmission of one more segment (S1-
S4) includes

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device to determine for which segment (S1-S4) that
largest portion of the segment (S1-S4) remains to be
transmitted, and
device to request transmission of this segment (S1).

15.   Device, as claimed in patent claim 13 or 14, at
which the device to request transmission of one more
segment (S1) includes
device to request transmission of only a portion (S11)
of said segment (S1), at which this portion (S11) is
included in that portion of the segment (S1) that has not
yet been transferred.

16.   Device, as claimed in patent claim 15, at which
the device to request transmission of a portion (S11) of
said segment (S1), includes
device to determine how large portion of the segment
(S1) that remains to be transferred,
device to estimate the transmission speed for the
transmitting unit (30) which is busy transmitting said
segment (S1) and for the transmitting unit (31) from which
transmission of said portion (S11) shall be requested,
device to determine, depending on the estimated
transmission speeds, the size of said portion (S11), and
device to request transmission of said portion (S11).

17.   Device, as claimed in any of the previous patent
claims, including
device to estimate the transmission speeds from
respective transmitting unit (30-33), and
device to request transmission of segments (S5-S8) of
different sizes, at which said device is arranged to
determine the size of respective segment (S5-S8) on basis
of the estimated transmission speeds.

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18.   Device, as claimed in any of the previous patent
claims, including
       device to estimate the transmission speeds from
respective transmitting unit, and
       device to select transmitting units (30-33) for the
transmission with regard to the estimated transmission
speed from respective transmitting unit.

AMENDED CLAIMS

[received by the International Bureau on 12 September 2000 (12.09.00) ;
original claims 1-18 replaced by amended claims 1-14 (3 pages)]

1.   Procedure, for control of data file transmission
between transmitting (30-33) and receiving units (20), at
which examples of the data file (F) that shall be
transmitted/transferred are stored at a plurality of
transmitting units (30-33), including the steps
      to request transmission of segments (S1-S4) of the data
file (F) from a plurality of transmitting units (30-33), and
      to receive said segments (S1-S4) from a plurality of
transmitting units (30-33), when the transmission of a segment
(S1-S4) from a transmitting unit is completed, request
transmission of one more segment (S1) of the data file (F)
from said transmitting unit, at which the transmission of this
one more segment (S1) from another transmitting unit has
started,at which the step to request transmission of one more
segment (S1) includes the step
      to request transmission of only a portion (S11) of
said more segment (S1), at which this portion (S11) is
included in the portion of the segment (S1) that has not yet
been transferred.

2.   Procedure, as claimed in patent claim 1, at which
each separate segment (S1-S4) is transmitted from only one
transmitting unit.

3.   Procedure, as claimed in patent claim 1 or 2, at
which each separate transmitting unit transmits only one
segment (S1-S4) of the file.

4.   Procedure, as claimed in patent claim 1, at which the
step to request transmission of one more segment (S1-S4)
includes the steps
      to determine for which segment (S1-S4) that largest
portion of the segment (S1-S4) remains to be transmitted, and
      to request transmission of this segment (S1).

5.   Procedure, as claimed in patent claim 1, at
which the step to request transmission of a portion (S11) of
said segment (S1) includes the step
      to determine how large portion of the segment (S1)
that remains to be transferred,
      to estimate the transmission speed for the
transmitting unit (30) that is busy transmitting said segment
(S1) and for the transmitting unit (31) from which
transmission of said portion (S11) shall be requested,

to determine, depending on the estimated transmission speeds, how large said portion (S11) shall be, and
to request transmission of said portion (S11).

6.   Procedure, as claimed in any of the previous patent claims, including the steps
to estimate the transmission speeds from respective transmitting unit (30-33), and
to request transmission of segments (S5-S8) of different sizes, at which the size of respective segment is determined on basis of the estimated transmission speeds.

7.   Procedure, as claimed in any of the previous patent claims, including the step
to estimate the transmission speeds from respective transmitting unit, and
to select transmitting units (30-33) for the transmission with regard to the estimated transmission speed from respective transmitting unit.

8.   Device for control of data file transmission between transmitting (30-33) and receiving units (20), at which examples of the data file (F) that shall be transferred is stored at a plurality of transmitting units (30-33), including
device to request transmission of segments (S1-S4) of the data file (F) from a plurality of transmitting units (30-33), and
device to receive said segments (S1-S4) from a plurality of transmitting units (30-33), when the transmission of a segments (S1-S4) from a transmitting unit is completed, request transmission of one more segment (S1) of the data file (F) from said transmitting unit, at which the transmission of this one more segment (S1) from another transmitting unit has started, at which the device to request transmission of one more segment (S1) includes
device to request transmission of only a portion (S11) of said segment (S1), at which this portion (S11) is included in that portion of the segment (S1) that has not yet been transferred.

9.   Device, as claimed in patent claim 8, at which each separate segment (S1-S4) is transmitted from only one transmitting unit.

10.   Device, as claimed in patent claim 8 or 9, at which each separate transmitting unit transmits only one segment (S1-S4) of the file.

AMENDED SHEET (ARTICLE 19)

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11. Device, as claimed in patent claim 10, at which the device to request transmission of one more segment (S1-S4) includes

device to determine for which segment (S1-S4) that largest portion of the segment (S1-S4) remains to be transmitted, and

device to request transmission of this segment (S1).

112. Device, as claimed in patent claim 11, at which the device to request transmission of a portion (S11) of said segment (S1), includes

device to determine how large portion of the segment (S1) that remains to be transferred,

device to estimate the transmission speed for the transmitting unit (30) which is busy transmitting said segment (S1) and for the transmitting unit (31) from which transmission of said portion (S11) shall be requested,

device to determine, depending on the estimated transmission speeds, the size of said portion (S11), and

device to request transmission of said portion (S11).

13. Device, as claimed in any of the previous patent claims, including

device to estimate the transmission speeds from respective transmitting unit (30-33), and

device to request transmission of segments (S5-S8) of different sizes, at which said device is arranged to determine the size of respective segment (S5-S8) on basis of the estimated transmission speeds.

14. Device, as claimed in any of the previous patent claims, including

device to estimate the transmission speeds from respective transmitting unit, and

device to select transmitting units (30-33) for the transmission with regard to the estimated transmission speed from respective transmitting unit.
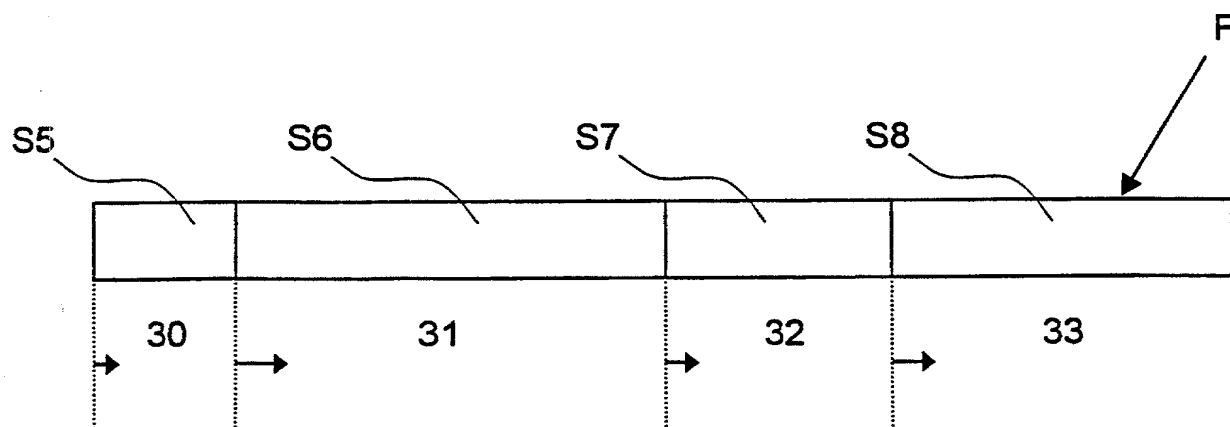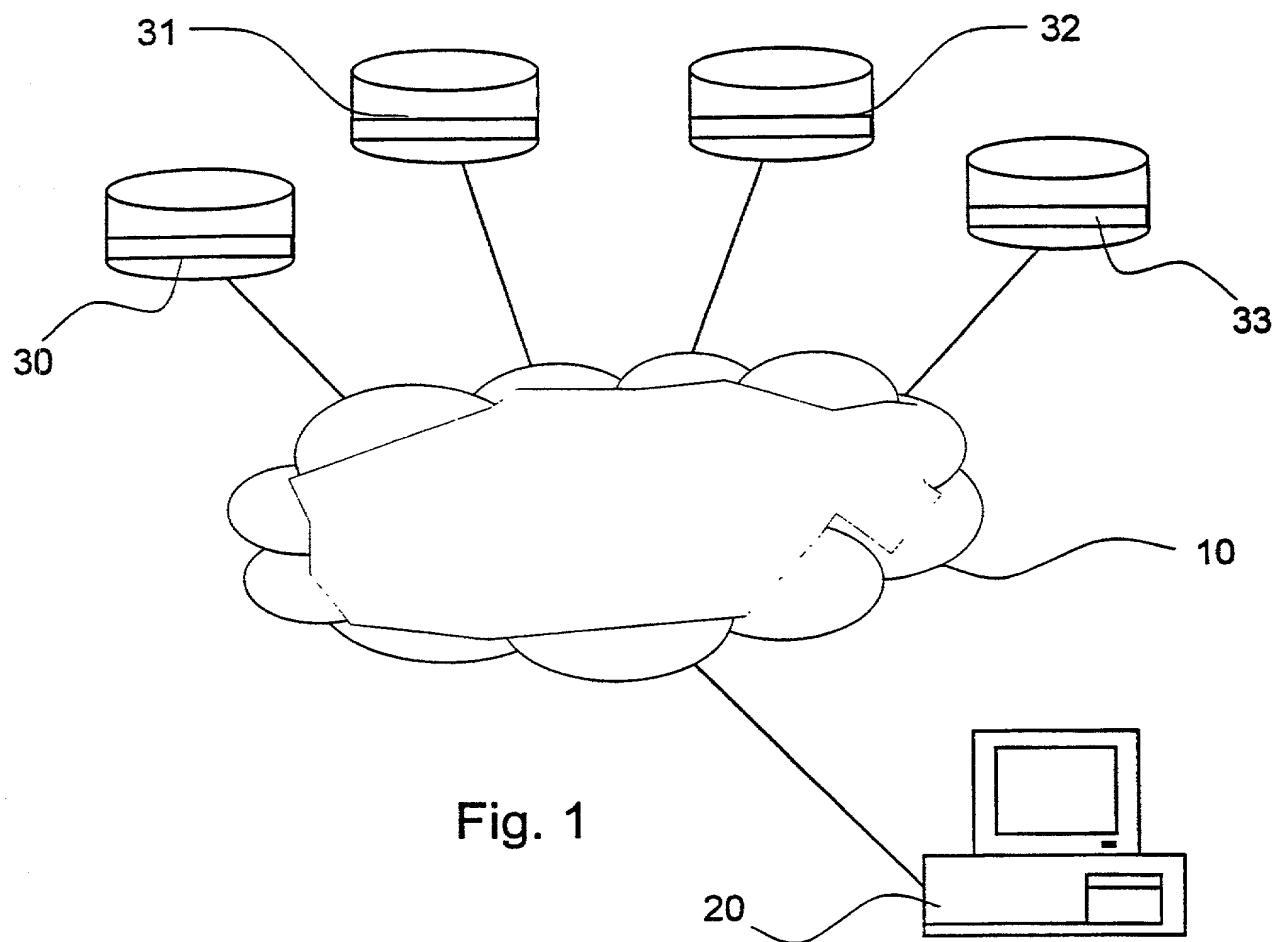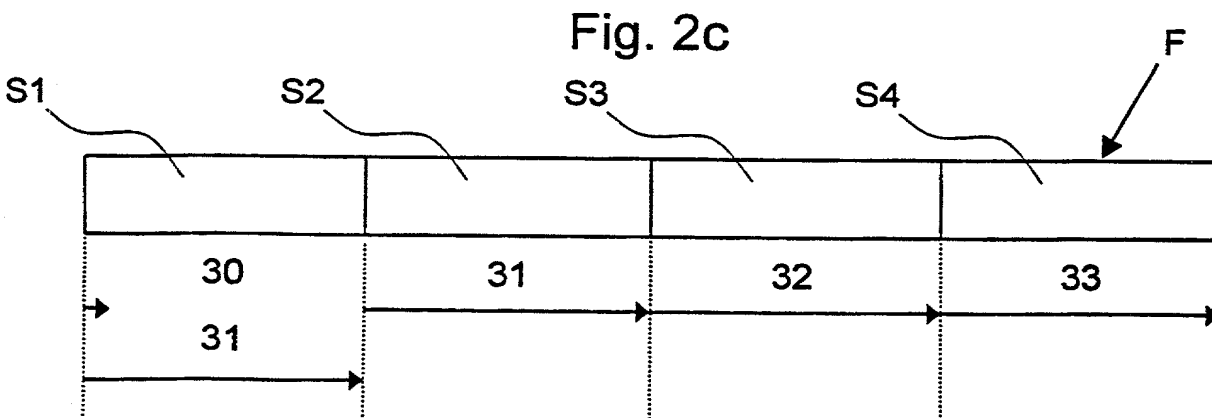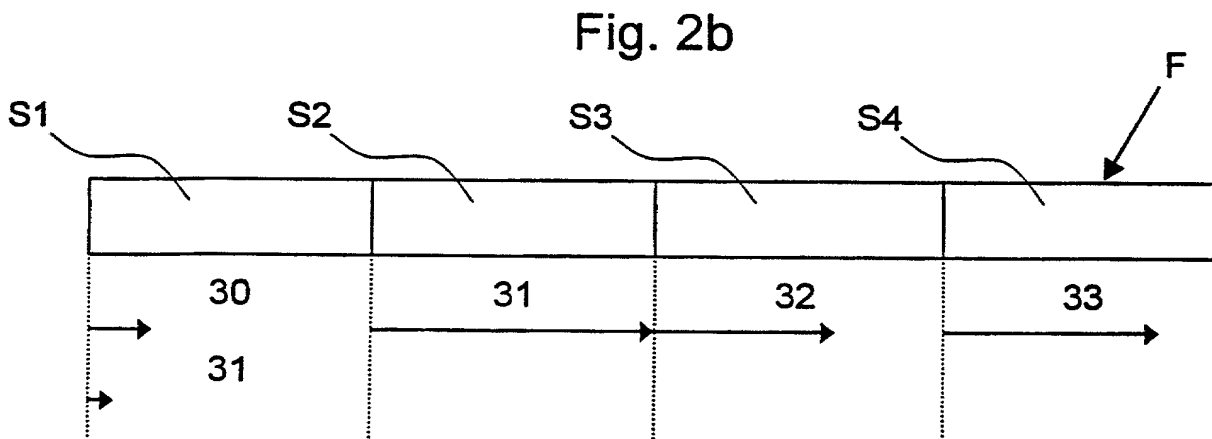
Fig. 1

Fig. 4a

Fig. 2a

Fig. 2b

Fig. 2c

Fig. 2d

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S1 S2 S3 S4 F

| 30 | 31 | 32 | 33 |

Fig. 3a

S1 S2 S3 S4 F

| 30 | 31 | 32 | 33 |

Fig. 3b

S1 S2 S3 S4 F

| 30 | 31 | 32 | 33 |

31

Fig. 3c

S1 S11 S2 S3 S4 F

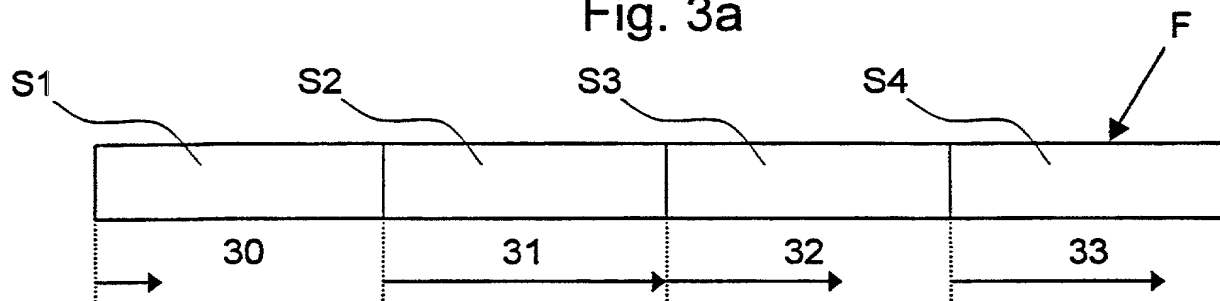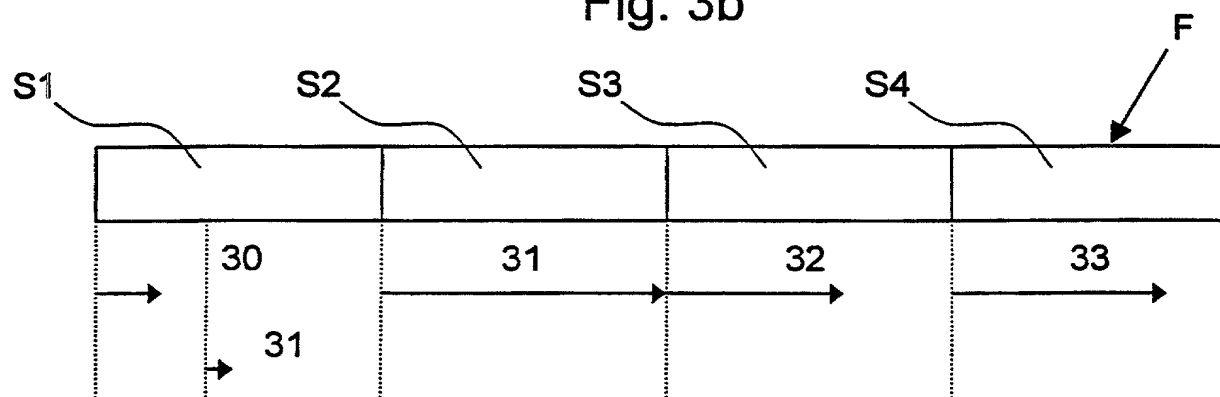| 30 | 31 | 32 | 33 |

31
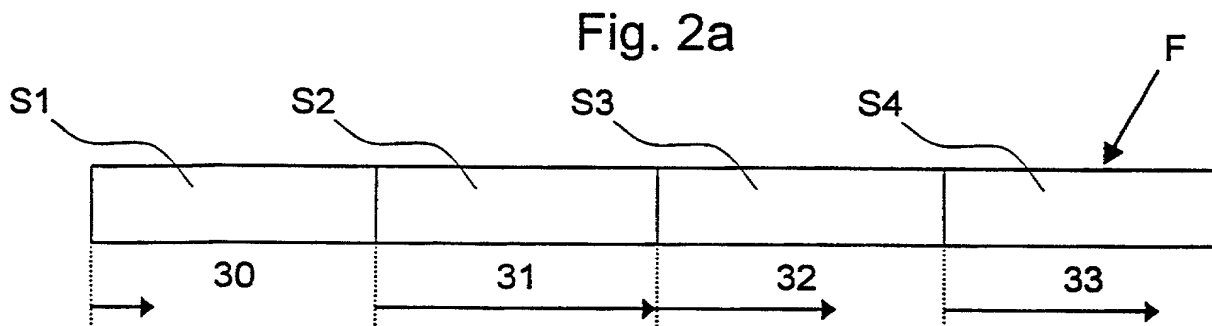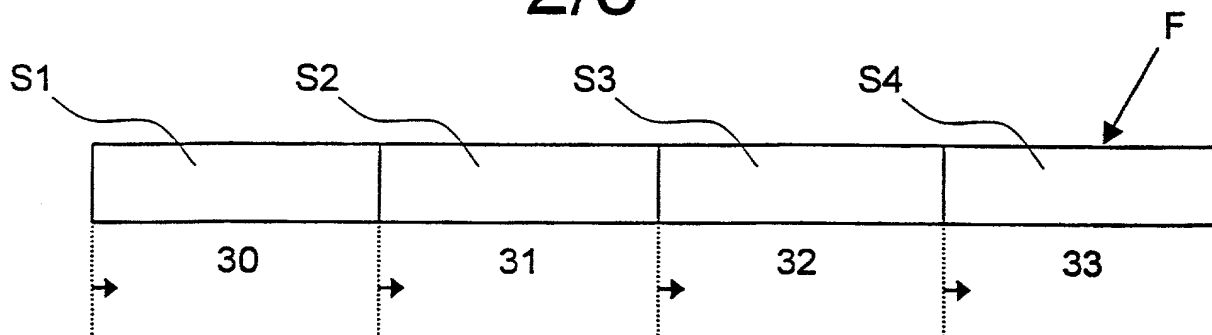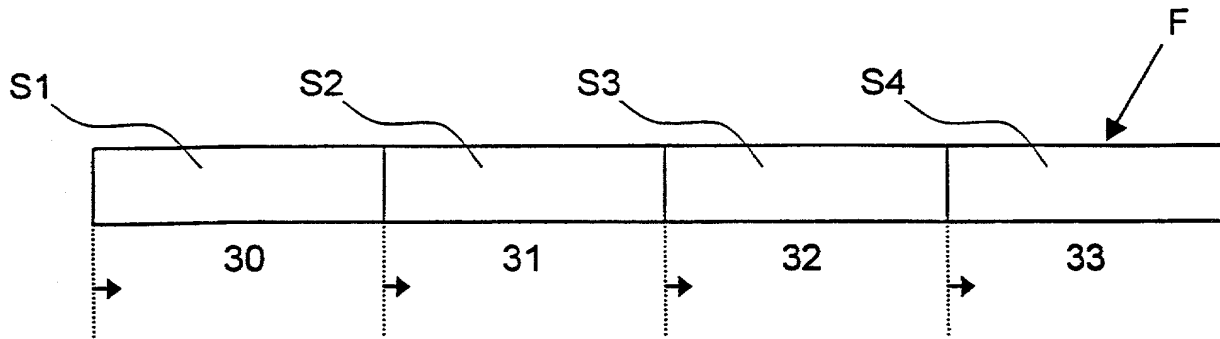
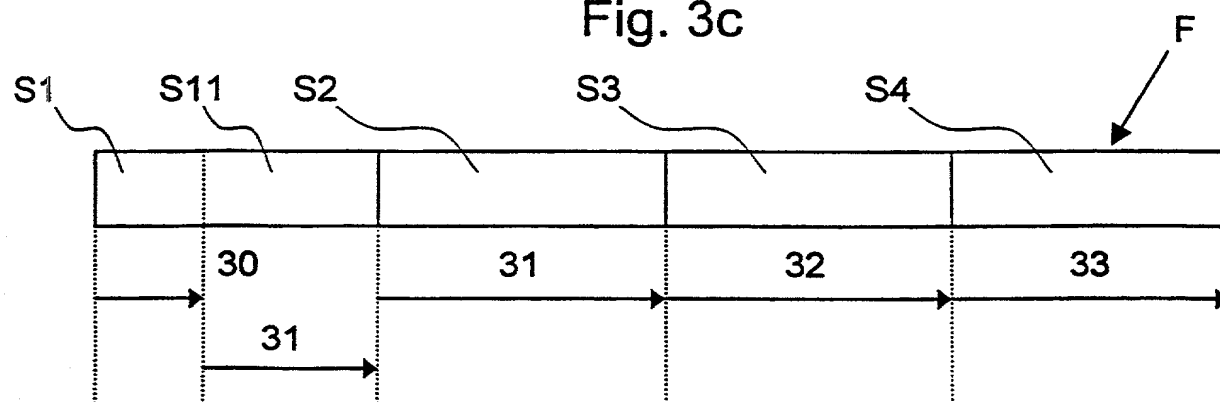Fig. 3d

Declaration, Power of Attorney and Petition

WE (I) the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PROCEDURE AND DEVICE FOR CONTROL OF DATA FILE TRANSMISSION

the specification of which

☐ is attached hereto.

☐ was filed on _____ as

    Application Serial No. _____

    and amended on _____ .

☒ was filed as PCT international application

    Number   PCT/SE00/00881 _____

    on   May 3, 2000 _____ ,

    and was amended under PCT Article 19

    on _____ (if applicable).

        We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

        We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

        We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
9901638-8	Sweden	6 May 1999	☒ Yes ☐ No

We (I) hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

(Application Number)	(Filing Date)
(Application Number)	(Filing Date)

        We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or under § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.	Filing Date	Status (pending, patented, abandoned)
PCT/SE00/00881	May 3, 2000	

And we (I) hereby appoint the following registered practitioner(s):

|||||||||
22850

as our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to

|||||||||
22850

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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